CLAIMS

1. A method of production of a grain-oriented electrical steel sheet superior in magnetic characteristics improving the core loss by forming lined closure domains substantially perpendicular to the rolling direction of the steel sheet and at substantially constant line spacing by scanning continuous wave laser beam, said method of production of grain-oriented electrical sheet characterized in that the laser is of a TEM_{00} mode with an intensity profile of the laser beam in a cross-section perpendicular to the direction of beam propagation having a maximum intensity near the center of the optical axis and in that the focused beam spot diameter in rolling direction d (mm), a linear scan rate V (mm/s) of the laser beam, and an average output P (W) of the laser are in the following ranges:

$$0<d\leq 0.2$$

$$0.001\leq P/V\leq 0.012$$

2. A method of production of a grain-oriented electrical steel sheet superior in magnetic characteristics as set forth in claim 1, characterized in that said d, V, and P are in the following ranges:

$$0.010\leq d\leq 0.10$$

$$0.001\leq P/V\leq 0.008$$

3. A method of production of a grain-oriented electrical steel sheet superior in magnetic characteristics as set forth in claim 1, characterized in that said d, V, and P are in the following ranges:

$$0.010<d\leq 0.060$$

$$0.002\leq P/V\leq 0.006$$

4. A method of production of a grain-oriented electrical steel sheet superior in magnetic characteristics as set forth in claim 1, characterized in that said d, V, and P are in the following ranges:

$$0.010<d<0.040$$

$$0.002\leq P/V\leq 0.006$$

5. A method of production of a grain-oriented electrical steel sheet superior in magnetic characteristics as set forth in any one of claims 1 to 4, characterized in that when the focused beam spot diameter in rolling direction is d, the spot diameter in the direction perpendicular to that is dc, and the laser average output is P, the instantaneous peak power density Ip (kW/mm^2) is defined as Ip=P/(dxdc) and the range of Ip is $0<Ip\leq100$ kW/mm^2.

6. A method of production of a grain-oriented electrical steel sheet superior in magnetic characteristics as set forth in any of claims 1 to 4, characterized in that said laser apparatus is based on a continuous wave fiber laser apparatus with an emission wavelength λ of $1.07\leq\lambda\leq2.10$ μm.

7. A method of production of a grain-oriented electrical steel sheet superior in magnetic characteristics as set forth in claim 6, characterized in that said laser apparatus is a continuous wave fiber laser with an average output of 10W or more.

8. A grain-oriented electrical steel sheet superior in magnetic characteristics improving the core loss characteristic by forming linear closure domains substantially perpendicular to the rolling direction of the steel sheet and at substantially constant spacing by scanning by a continuous wave laser beam, said grain-oriented electrical sheet characterized in that a rolling direction width Wl of a laser beam scribing trace and/or linear closure domain is $0<Wl\leq0.2$ mm.

9. A grain-oriented electrical steel sheet superior in magnetic characteristics as set forth in claim 8, characterized in that a rolling direction width Wl of a laser beam scribing trace and/or linear closure domain is $0.01\leq Wl\leq0.1$ mm.

10. A grain-oriented electrical steel sheet superior in magnetic characteristics as set forth in

claim 8, characterized in that a rolling direction width Wl of a laser beam scribing trace and/or linear closure domain is $0.01 \leq Wl \leq 0.04$ mm.

11. A grain-oriented electrical steel sheet superior in magnetic characteristics as set forth in any one of claims 8 to 10, characterized in that a rolling direction spacing Pl of the laser beam linear scribing trace and/or linear closure domains is $1.5 \leq Pl \leq 11.0$mm

12. A grain-oriented electrical steel sheet superior in magnetic characteristics as set forth in any one of claims 8 to 10, characterized in that a rolling direction spacing Pl of the laser beam linear scribing trace and/or linear closure domains is $3.0 \leq Pl \leq 7.0$ mm.